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**MARKET SITUATION AND OUTLOOK FOR NORTHWESTERN
HAWAIIAN ISLANDS SPINY AND SLIPPER LOBSTERS**

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PREFACE

This report was prepared by Karl C. Samples of the University of Hawaii and by Paul D. Gates while under contract to the Western Pacific Regional Fishery Management Council (WESTPAC). It is the result of a cooperative research project on the economics of commercial lobster trapping in the Northwestern Hawaiian Islands (NWHI). The cooperating agencies include WESTPAC, the Southwest Fisheries Center of the National Marine Fisheries Service (NMFS), Honolulu Laboratory, and the University of Hawaii's Department of Agricultural and Resource Economics. Funding for the project was provided by WESTPAC and NMFS.

This report is the second of four which document the research findings of this project. The first report described the dynamics of the fishery since 1983 in terms of fleet composition and vessel fishing patterns. The third report will describe the results of a cost and earnings study of the NWHI commercial lobster fishery, and a fourth one will be devoted to the economics of limited entry in the lobster fishery.

This report was prepared under contract to WESTPAC and NMFS. Thus, the statements, findings, and conclusions put forth herein do not necessarily represent the views of WESTPAC or NMFS.

ACKNOWLEDGMENTS

This research was supported in part by the Hawaii Institute of Tropical Agriculture and Human Resources. The authors wish to express their sincere appreciation to lobster wholesalers and brokers who took time to answer our detailed marketing questions. Sam Pooley contributed significantly to the planning and implementation of this research effort. Research assistance by James Hollyer and Karin Kami was also valuable. We gratefully acknowledge review comments by Sam Pooley and Ray Clarke.

OVERVIEW

Changing market conditions greatly influence the pattern of commercial development of the Northwestern Hawaiian Islands (NWHI) lobster fishery. The purpose of this report is to portray the past and current marketing situation for NWHI lobsters, and to project market conditions for the next several years. The report documents landings and trade in lobsters worldwide with particular reference to the important U.S. market. Marketing arrangements for Hawaii lobsters are also identified. Survey data are used to help reveal current perceptions of U.S. wholesalers about Hawaii lobster products. A market outlook is then provided for Hawaii lobsters based on current market conditions and trends. Specific recommendations are also made to enhance lobster marketing efforts.

All indications suggest a positive market outlook for NWHI lobsters. Demand for NWHI lobster products will continue to grow over the next two to three years following the general growth in U.S. consumer demand for lobster products. This increased demand, generated by increases in personal income, will tend to generate modest increases in the real price of spiny and slipper lobster tails, somewhere in the range of 3 to 7 percent, annually.

Increased U.S. demand will be met primarily by increased imports of slipper lobster products from warm-water areas of the world. Barring any unforeseen demise of spiny fisheries in Australia, New Zealand or South Africa, spiny imports will remain fairly constant. However, the weakening trend in the value of the U.S. dollar will to some extent work against imports, thereby putting upward pressures on market prices.

The U.S. market for lobster products in all size ranges will continue to be firm over the next few years. NWHI fishermen will have strong revenue incentives to increase their fishing effort. Demand for all lobsters caught with 4 to 8-ounce tail weights will tend to be strong. However, NWHI fishermen may find it increasingly difficult to compete with foreign sources for tails less than 4-ounces in the face of increased imports of frozen IQF slipper tails. Fishermen will begin to detect reduced average selling price of loads that contain large amounts of small slipper lobsters.

Given firm market conditions, NWHI lobster fishermen will have little difficulty marketing their catch, even with current low-level promotional efforts, and lack of marketing order. Nevertheless, there appear to be sufficient reasons to investigate opportunities for improving product promotion, and initiating basic marketing order. However, both areas are very complex and will involve considerable inter-industry coordination and cooperation, along with government support.

INTRODUCTION

Changing market conditions greatly influence the pattern of commercial development of the Northwestern Hawaiian Islands (NWHI) lobster fishery. The post-1978 rapid expansion of fresh-frozen tail landings, for example, came about largely in response to a depressed local live-lobster market, combined with a strong demand for frozen tails on the U.S. mainland. Vessels began taking longer and more distant trips, with a commensurate increase in aggregate landings. In 1985, an estimated 1.1 million pounds of spiny and 0.7 million pounds of slipper lobsters were landed, nearly all of which was sold in frozen form (Skillman, Milone and Witham, 1986). The increase in slipper lobster landings since 1983 is a more recent instance where evolving marketing conditions have stimulated new fishing patterns and outputs. In this case, a growing U.S. restaurant market demand for frozen slipper lobster tails has encouraged NWHI fishermen to seek slipper lobsters of all sizes.

The market forces which affect the fishery are generated by complex supply and demand interrelationships that are dynamic and extend worldwide. Over 400 million pounds of lobsters are landed annually throughout the world, of which 96 million pounds enters world trade. Competition among existing and new supply sources is great. Furthermore, as an internationally traded commodity, supply and demand circumstances for lobsters tend to be volatile, resulting in frequent price adjustments. Together these factors lead to uncertainty about the future market environment for NWHI lobsters.

The purpose of this report is to portray the past and current marketing situation for NWHI lobsters, and to project market conditions for the next several years. The report documents landings and trade in lobsters worldwide with particular reference to the important U.S. market. Marketing arrangements for Hawaii lobsters are also identified. Survey data are used to help reveal current perceptions of U.S. wholesalers about Hawaii lobster products. A market outlook is then provided for Hawaii lobsters based on current market conditions and trends. Specific recommendations are also made to enhance lobster marketing efforts.

WORLD LOBSTER LANDINGS AND TRADE

Reported landings of all lobster species throughout the world reached a record level of approximately 403 million pounds in 1984 (Table 1). Throughout this report, the terms "poundage" or "volume" refer to edible lobster product weight. This includes the shell weight for lobster products sold in a shell-on form. This historic high is the result of a fairly steady 20-year upward growth trend in landings for most species. During the 1979-84 period aggregate landings for all species grew at an average annual rate of about 3 percent.

Table 1. World Lobster Catches: 1979-84

SPECIES/COUNTRY	CALENDAR YEAR					
	1979	1980	1981 (THOUSAND POUNDS)	1982	1983	1984
Spiny						
Australia	32,652	31,200	32,703	34,565	38,965	34,508
Cuba	24,244	23,290	23,501	25,729	24,088	27,867
Brazil	15,668	14,687	18,895	19,887	12,303	23,847
New Zealand	9,656	9,389	10,035	10,557	11,027	12,003
Others	74,317	73,830	67,301	58,831	67,259	73,856
Subtotal	156,537	152,396	152,435	149,570	153,641	172,082
Slipper						
Thailand	0	0	3,427	2,486	2,277	2,277
Australia	536	690	820	732	756	798
Singapore	90	117	139	99	104	126
Quatar	0	0	0	9	22	48
Others	15	143	15	271	84	73
Subtotal	641	950	4,401	3,597	3,242	3,321
American						
Canada	47,560	43,994	47,818	50,262	60,952	62,373
United States	37,175	36,941	37,483	39,434	44,195	43,954
Subtotal	84,735	80,935	85,301	89,696	105,146	106,328
Other Lobsters						
U.K. Scotland	28,700	27,576	28,683	27,477	32,394	36,822
France	24,835	19,325	24,799	19,470	23,402	21,641
Others	52,967	63,773	53,257	66,766	66,396	62,446
Subtotal	106,502	110,674	106,740	113,713	122,192	120,909
Total	348,415	344,955	348,878	356,576	384,221	402,640

Source: Food and Agricultural Organization of the United Nations (1980 and 1984), Yearbook of Fishery Statistics: Catches and Landings, Rome, Italy.

Landings of spiny lobsters have long dominated world lobster landings in terms of poundage, although the recent trend is in favor of other types. In 1984, spiny lobsters accounted for 43 percent of the world catch for a total of 172 million pounds. American and Norway lobsters dominated the balance of the catch. Reported slipper lobster landings contributed 1 percent to the total.

Over 50 different countries reported lobster catches in 1984. Of these, the dominant producing countries are Canada (15 percent) and the United States (11 percent). Other countries which produced 5 percent or more of landings were Australia (9 percent), United Kingdom (9 percent), Cuba (7 percent), Brazil (6 percent) and France (5 percent).

Lobsters are an internationally traded commodity of growing importance. In 1984, exports from 27 different countries totaled 97 million pounds valued at \$511 million. This represents a nearly 30 percent volume increase over 1979 export levels. For many years Canada has dominated the world export market with its sales of live American lobsters to the U.S. (Figure 1a). Australia is the second most important exporter with 17 percent of the export market in 1984. Most other producing countries have held fairly steady market shares with the exception of Brazil which rapidly secured 6 percent of the world market with its sales of frozen spiny lobster tails.

The U.S., Japan and 12 western European countries reported lobster imports in 1984 (Figure 1b). The U.S. has long been a major importer. It purchased 63 percent of available world market supplies in 1984, up from 59 percent in 1979. In 1984, this represented approximately 74 million pounds of lobster products of various forms. Japan and France are currently the other two top lobster importers. In 1984, each country imported approximately 14 percent of the world total, or approximately 15 to 16 million pounds apiece. Imports by these two countries have also been growing in absolute terms as well as relative market shares since 1979.

THE U.S. MARKET FOR LOBSTERS

Supply From Domestic Sources

U.S. lobster landings in 1985 of spiny and American lobster amounted to 51.4 million pounds valued dockside at \$ 129 million (USDC, 1985). Landings of American lobster comprised 90 percent of this total in terms of poundage and 89 percent in terms of value (Figure 2a,2b). Data are not published on U.S. slipper lobster catches.

Between 1979-85, total U.S. lobster landings increased by 3 percent. This growth is largely associated with the recent expansion of the American lobster fisheries of Maine and Massachusetts. Much discussion has focussed on whether this higher production is sustainable even given new management

Figure 1a. Principal Lobster Importing Countries in Terms of Edible Product Volume: 1979 and 1984

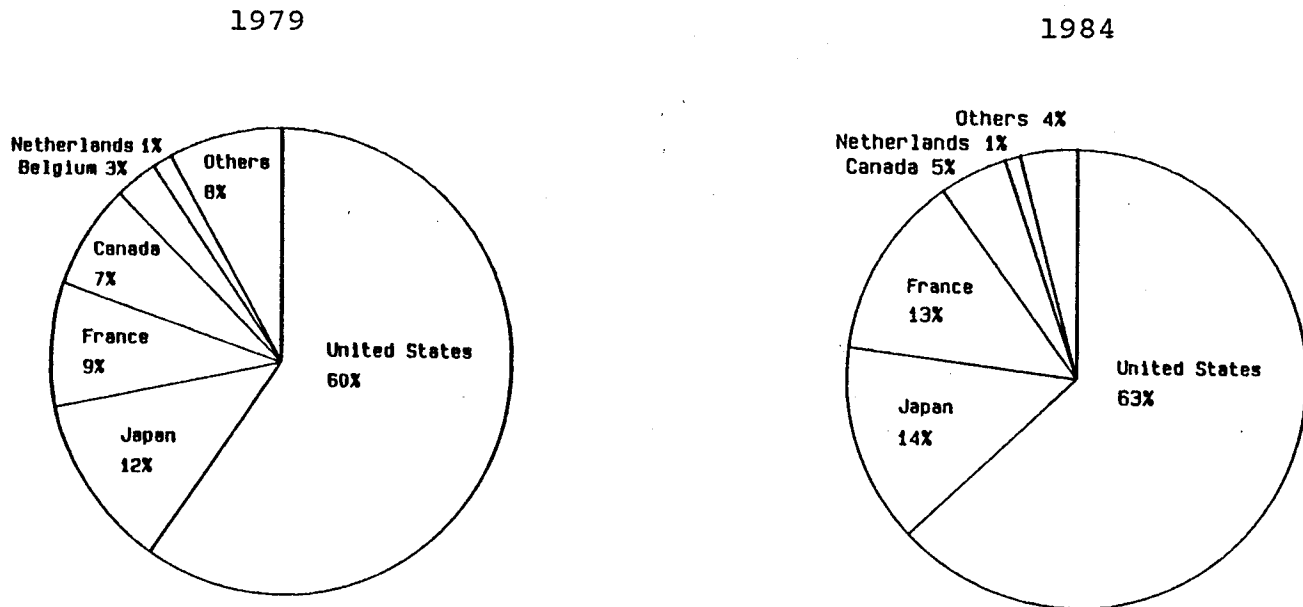
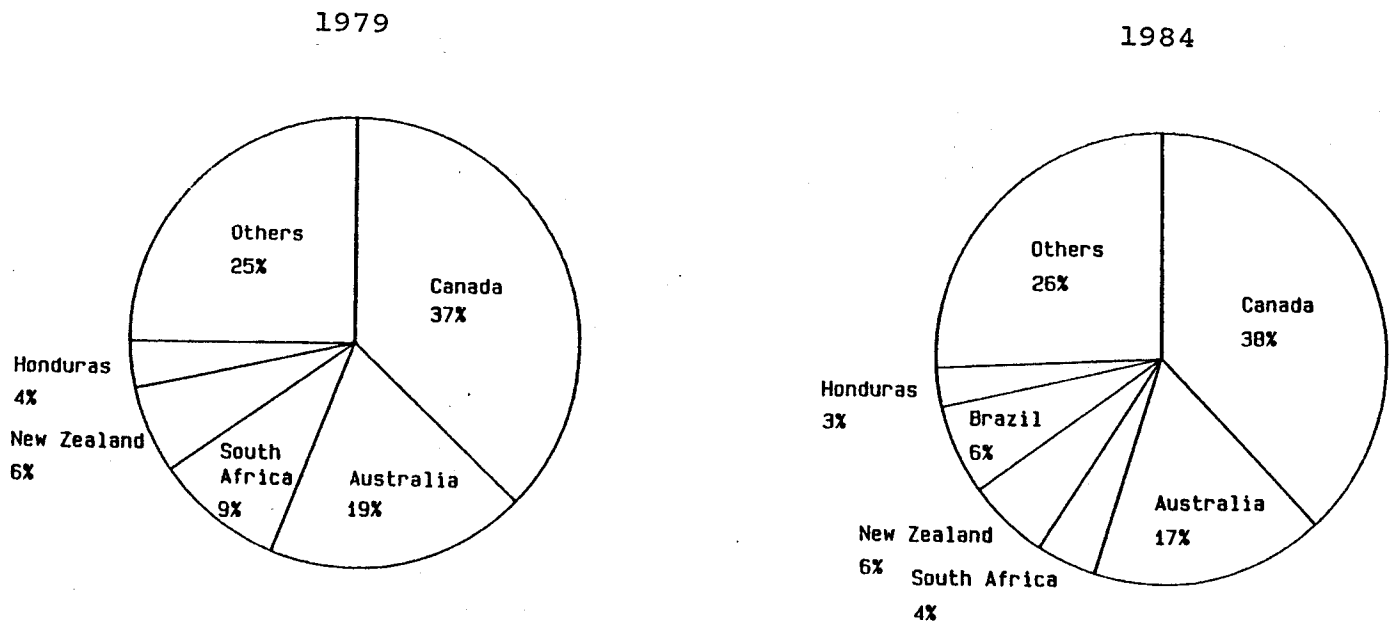


Figure 1b. Principal Lobster Exporting Countries in Terms of Edible Product Volume: 1979 and 1984



Source: U.S. Department of Commerce, National Marine Fisheries Service, Current Fishery Statistics No. 8380 (April 1986), Fisheries of the United States: 1985, Washington D.C. (and previous issues).

Figure 2a. U.S. Lobster Landings in Terms of Edible Product Volume: 1979-85

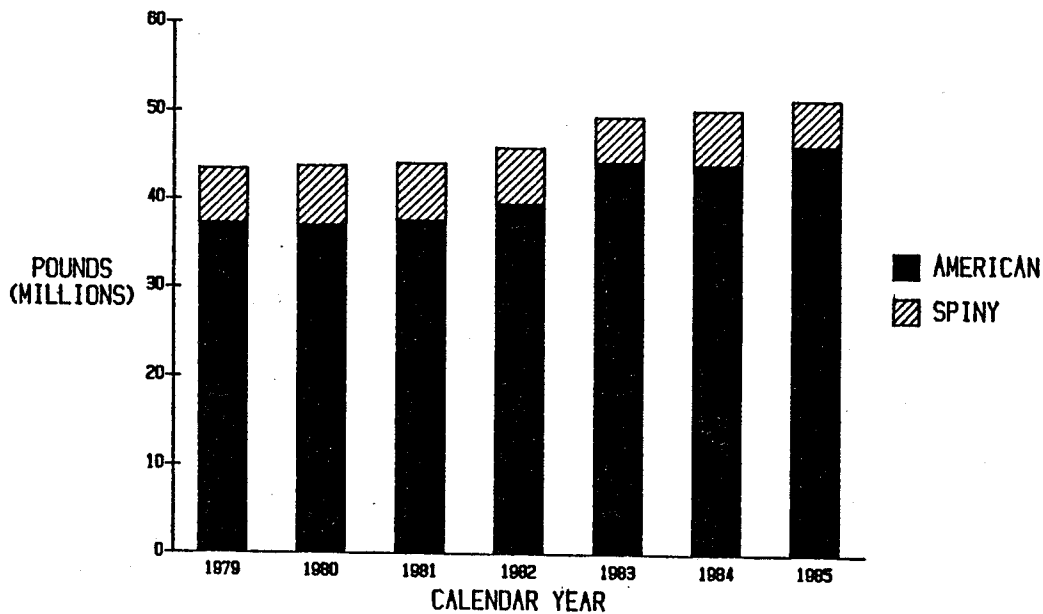
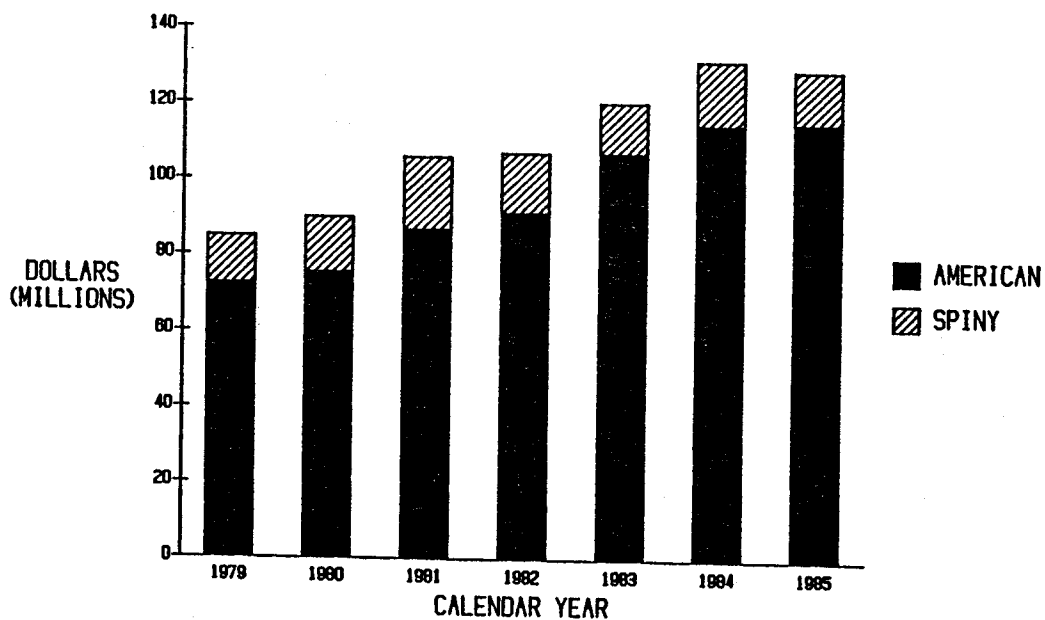


Figure 2b. U.S. Lobster Landings in Terms of Nominal Value: 1979-85



Source: U.S. Department of Commerce, National Marine Fisheries Service, Current Fishery Statistics No. 8380 (April 1986), Fisheries of the United States: 1985, Washington D.C. (and previous years).

controls in place (see for example Botsford et al., 1986). It is also unclear how new minimum size regulations will affect future harvests.

U.S. spiny lobster landings have fluctuated between 6.3 and 5.2 million pounds since 1979. Overall, the catch trend has been declining at an average annual rate of 4 percent over the period 1979-85. Much of the downward trend is tied to a 1.5 million pound drop in Florida spiny lobster catch (69 percent of the total) during 1985. This reduction was partially offset by increased production in Hawaii (21 percent of total) and California (5 percent of total). It is uncertain whether the 1985 reduction in Florida landings, attributed to overfishing, signals a long term downward trend in Gulf spiny landings.

Steady increases in nominal ex-vessel lobster prices (average price per pound landed) during 1979-85 resulted in a 10 percent average annual growth in the total ex-vessel value of American lobster landings. Despite a reduction in poundage, the dockside value of spiny landings increased by an average of 2 percent per year during 1979-85. This growth in nominal landings value is associated with fairly steady increases in average price per pound landed for both American and spiny lobsters (Figure 3a). During this period, nominal dockside prices for American lobsters grew at an average annual rate of 4.7 percent and peaked during 1984. Dockside prices for spiny lobsters increased by an average of 5.5 percent and peaked in 1981.

Real ex-vessel prices (after adjusting for inflation) registered slight declines between 1979-85, despite strong gains in nominal prices (Figure 3b). Real ex-vessel prices for American and spiny lobsters fell on the average by 2.3 percent and 1.7 percent, respectively. As a consequence, the inflation-adjusted value of aggregate U.S. lobster landings exhibits only a slight overall upward trend between 1979-85, and the real value of spiny landings declined (Figure 4).

Lobster Imports

Imports accounted for approximately 60 percent of total U.S. lobster supplies in 1985. This is typical of the past few decades during which the U.S. has become increasingly dependent on foreign sources to supply a burgeoning domestic demand for live lobsters and fresh-frozen lobster tails. In 1985, imports of spiny and American lobsters equalled 77 million pounds in product weight, valued (at the point of entry) at \$465 million. Spiny lobster products constituted 56 percent of the 1985 total in terms of volume and 73 percent in terms of value. The remaining share was comprised primarily of live American lobsters from Canada. The U.S. has and continues to import other types of lobsters. Data are not available on the amounts and value of these imports, but they probably contribute only a small fraction to the total. For example, slipper lobsters tails are routinely imported from India, Thailand, Indonesia and Sri Lanka. A large U.S. demand exists in the restaurant market for small

Figure 3a. U.S. Nominal Average Annual Ex-Vessel Lobster Prices: 1979-85

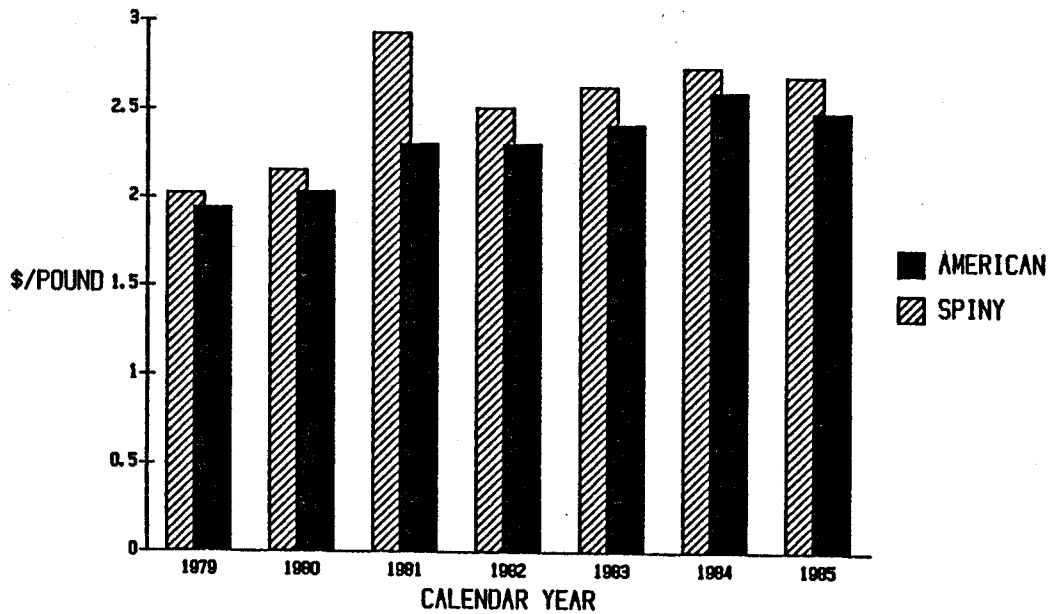
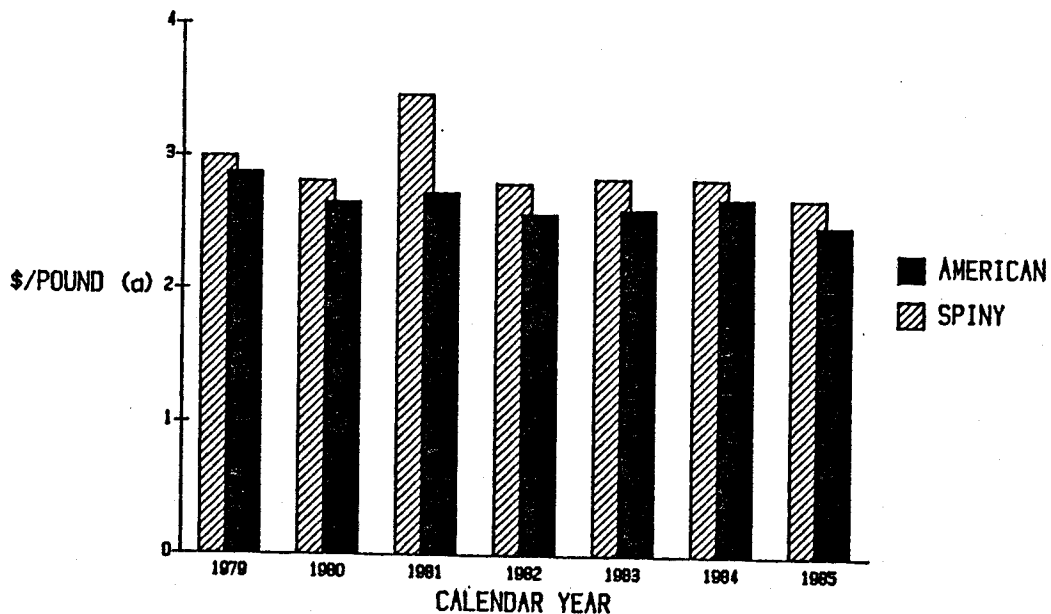


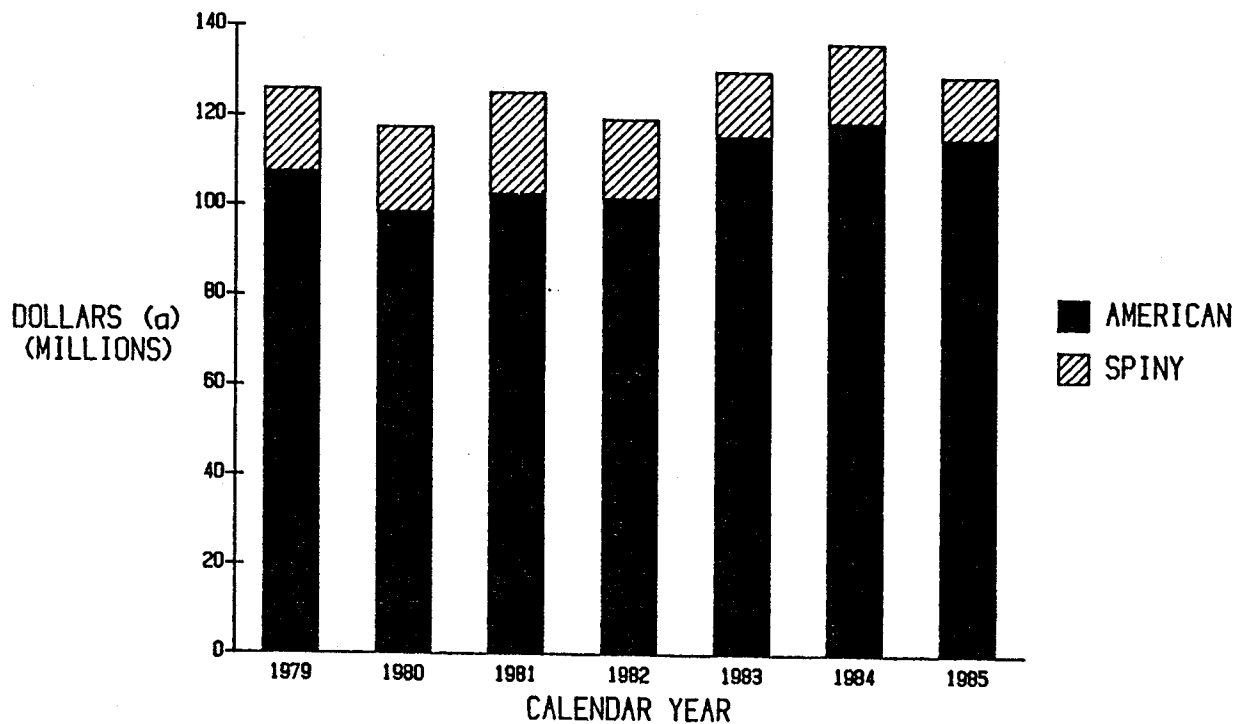
Figure 3b. U.S. Real Average Annual Ex-Vessel Lobster Prices: 1979-85



Source: U.S. Department of Commerce, National Marine Fisheries Statistics No. Current Fishery Statistics No. 8380 (April 1986), and previous issues).

Notes: (a) All prices expressed in 1985 (CPI adjusted) dollars. U.S. Department of Commerce, Bureau of the Census, Statistical Abstract of the United States: 1986 (106th edition, 1985), Washington D.C. and U.S. Department of Commerce, Bureau of Economic Analysis, Survey of Current Business (November 1986), Washington D.C.

Figure 4. Real Value of U.S. Lobster Landings: 1979-85



Source: U.S. Department of Commerce, National Marine Fisheries Statistics No. Current Fishery Statistics No. 8380 (April 1986), Fisheries of the United States: 1985, Washington D.C. (and previous issues).

Notes: (a) All prices expressed in 1985 (CPI adjusted) dollars. U.S. Department of Commerce, Bureau of the Census, Statistical Abstract of the United States: 1986 (106th edition, 1985), Washington D.C. and U.S. Department of Commerce, Bureau of Economic Analysis, Survey of Current Business (November 1986), Washington D.C.

individually quick frozen (IQF) slipper tail meat. Norway lobsters are also imported from Europe.

The 1979-85 import trend is mixed (Figures 5a,5b). On the one hand, significant growth has occurred in American lobster imports both in terms of quantity and nominal value. Spurred by increased landings and a weakened Canadian dollar, import quantities of Canadian lobsters increased on the average by 18 percent annually during 1979-84. In terms of nominal value, American lobster imports doubled during the same period. On the other hand, the quantity of spiny lobster imports has declined slightly since 1979. Nevertheless, buoyed by higher market prices, the value of spiny imports grew on the average by 5 percent annually.

Nominal import prices (average price per pound imported) increased for both spiny and American lobsters during the 1979-85 period (Figure 6a). Spiny prices increased on the average by about 6 percent annually, and reached a maximum average price of \$7.82 per pound in 1985. Similarly, nominal prices of American lobster imports increased by nearly 9 percent on the average. Peak prices for Canadian imports were reached in 1984.

Expressed in real terms, however, price trends during 1979-85 were generally flat in the case of American lobster imports, or slightly negative in case of spiny imports (Figure 6b). This is likely attributable to lower demand during 1980-83 due to the combination of a sluggish economy, high interest costs associated with holding inventory, and a weakened U.S. dollar. Spiny import prices have since shown signs of modest recovery in response to changing domestic economic conditions.

In terms of product form and country of origin, imports of American lobsters are relatively easy to identify. All imports come from Canada. The bulk (80 percent) of imported American lobster arrives live, although Canada also exports some frozen whole lobsters, as well as canned lobster products.

Imports of spiny lobsters come in similar forms including frozen tails, frozen whole, and canned. However, approximately 68 percent of imported supplies are in the form of frozen tails. Over two dozen countries supply the important frozen tail market. Of these, Australia accounted for 31 percent of U.S. imports in 1985, followed by Brazil (17 percent), New Zealand (9 percent), South Africa (8 percent), and Honduras (5 percent) (Figure 7).

Australia's leadership in the frozen spiny (rock) lobster tail market began in 1954 following the collapse of the South African fishery in the face of over-exploitation. Since that time, lobster tails imported from Australia have been the industry standard.

The quality of lobster tail products from geographic areas is gauged by how well they compare to Australian tails. Importers, wholesalers and retailers generally differentiate between

Figure 5a. U.S. Lobster Imports in Terms of Edible Product Volume: 1979-85

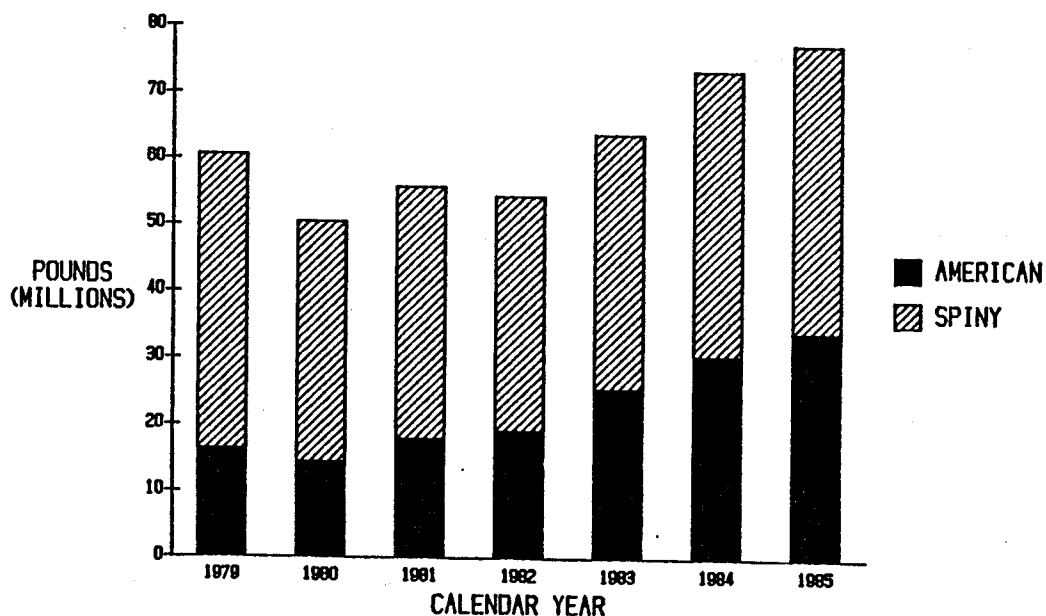
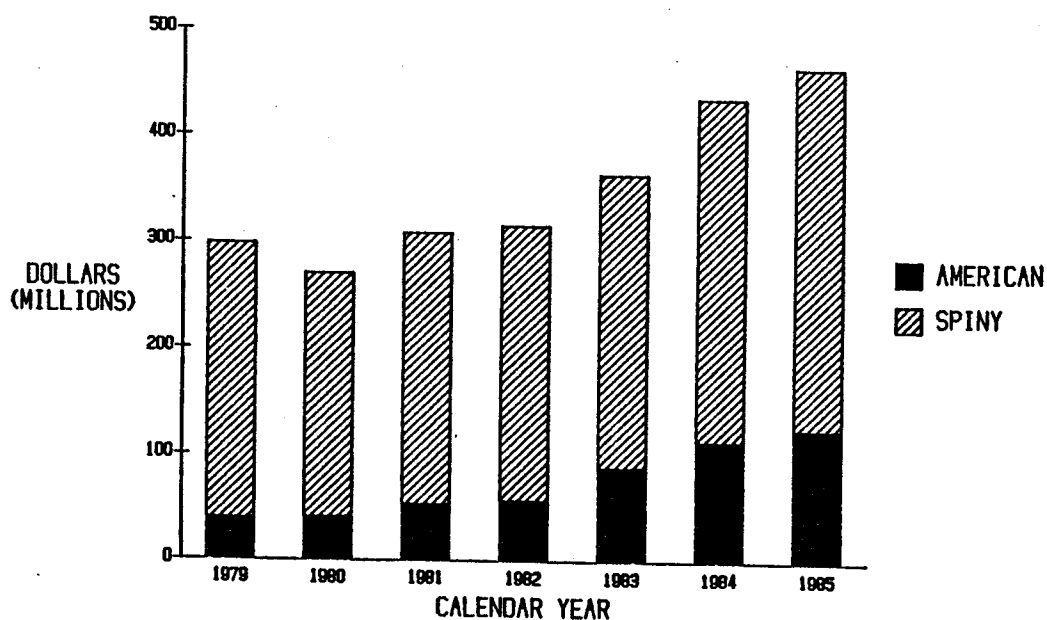


Figure 5b. U.S. Lobster Imports in Terms of Nominal Value: 1979-85



Source: U.S. Department of Commerce, National Marine Fisheries Service, Current Fishery Statistics No. 8380 (April 1986), Fisheries of the United States: 1985, Washington D.C. (and previous issues).

Figure 6a. U.S. Nominal Average Annual Import Prices: 1979-85

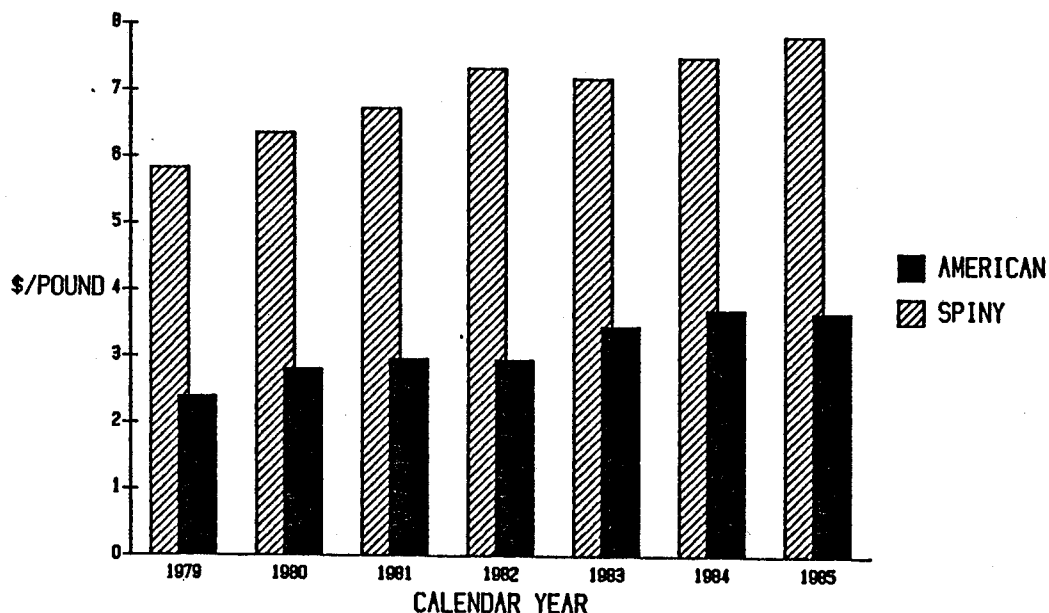
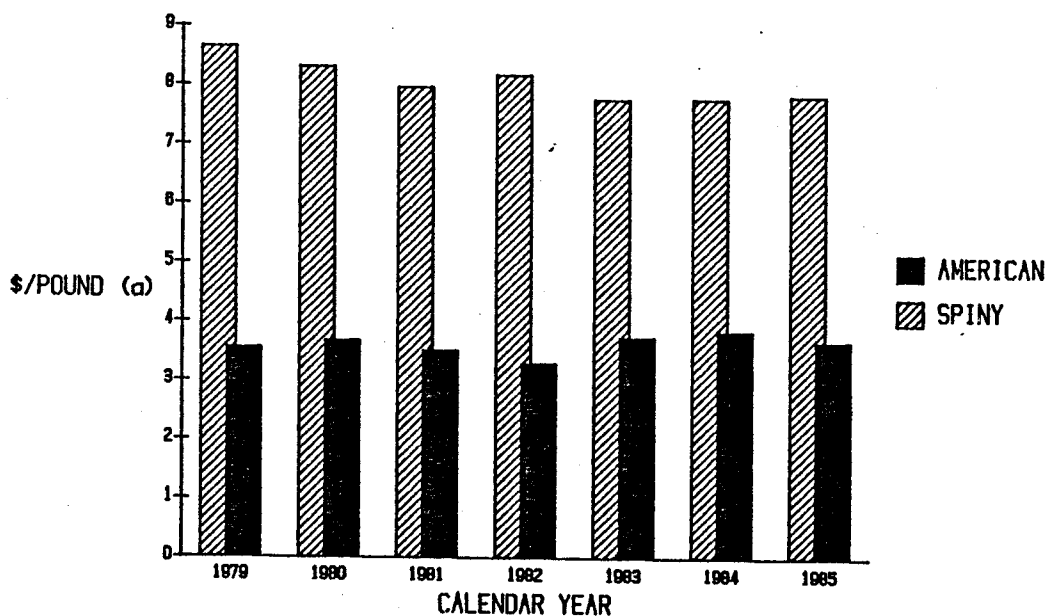


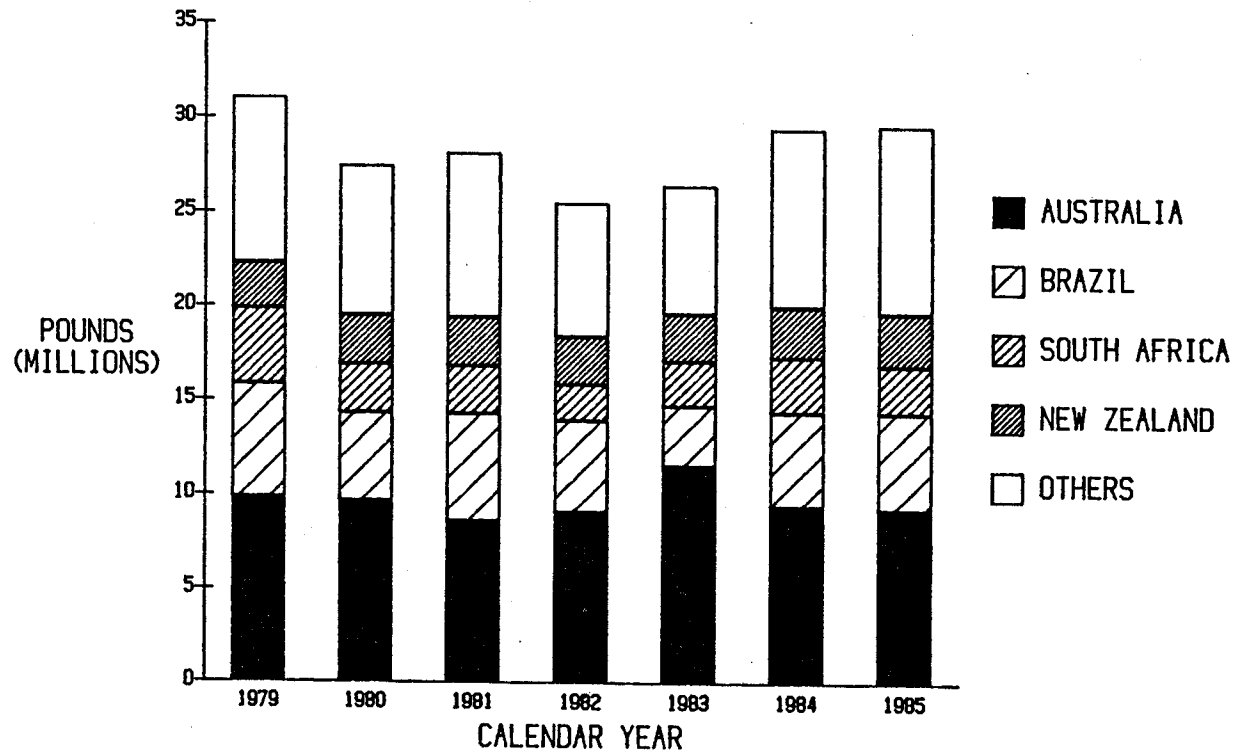
Figure 6b. U.S. Real Average Annual Import Prices: 1979-85



Source: U.S. Department of Commerce, National Marine Fisheries Statistics No. Current Fishery Statistics No. 8380 (April 1986), and previous issues).

Notes: (a) All prices expressed in 1985 (CPI adjusted) dollars. U.S. Department of Commerce, Bureau of the Census, Statistical Abstract of the United States: 1986 (106th edition, 1985), Washington D.C. and U.S. Department of Commerce, Bureau of Economic Analysis, Survey of Current Business (November 1986), Washington D.C.

Figure 7. Principal Sources of U.S. Spiny Lobster Imports in Terms of Edible Product Volume: 1979-85



Source: U.S. Department of Commerce, Bureau of the Census (1986), U.S. General Imports, Schedule A, Commodity by Country: December 1985, Washington D.C. (and previous issues).

lobsters imported from colder water regions of the world (Australia, New Zealand, South Africa) and those harvested from warmer water regions (Honduras, Bahamas, Mexico, and Florida) Terms that describe the temperature of the water from which lobsters are harvested have therefore become synonymous with product quality. Cold-water lobsters are equated with high quality products, while products derived from warm-water species are considered by many market middlemen to be of a lower quality.

There are two reasons underlying this quality distinction. The first is biological. Spiny lobsters coming from different ambient water temperatures are often different species and genera with distinct qualities. Food products derived from cold water species are widely considered to embody the best available mixture of consumer-valued characteristics such as yield and texture/consistency. The second reason relates to attention given to quality control in producing areas. Warm-water lobster fisheries are generally conducted in developing countries where product grading, sizing, and other quality controls are not closely monitored or followed. By comparison, cold-water lobster producing countries such as South Africa, Australia and New Zealand have producer or marketing institutions which strictly control the quality characteristics of lobster exports.

This system of distinguishing quality persists into the present, and is readily apparent in product prices. Australian cold water tails command a premium price, frequently \$3 - \$7 per pound above the price of spiny lobster tails harvested from warm water nations (Table 2).

U.S. imports of spiny lobster tails are highly seasonal (Figure 8). Peak imports generally occur during the early spring and remain strong throughout periods of high summer demand. Imports drop steadily during fall and start to increase again during late December. In part this reflects the seasonal fishing patterns for Australian rock lobsters, combined with seasonality in U.S. consumer demand which is highest during the summer months and during the December holiday season.

During 1984-86, buyers in Hawaii directly imported approximately about a third of a million pounds of lobster products annually from nine foreign countries (Table 3). No strong trend is apparent in total import quantities, although there is annual variation in relative importance of supply sources, and types of products imported. New Zealand sources supply nearly 85 percent of Hawaii imports, on the average. The next most important supplier is Taiwan which on the average provides 9 percent of Hawaii foreign lobster imports. Spiny lobster products comprise at least 77 percent of total imports (Table 4), followed by slipper tails (12 percent).

U.S. Lobster Consumption

U.S. consumption of American and spiny lobster products reached a historic high in 1985. Total consumption of American and spiny

Table 2. Average U.S. Wholesale Prices for Frozen Spiny Lobsters Tails by Size and Origin: July 1985 - January 1987(a)

TAIL SIZE (OUNCES)	ORIGIN					SRI LANKA
	AUSTRIA/LIA	BRAZIL	CARIBBEAN (\$ PER POUND)	INDIA	NEW ZEALAND	
Under 1	(b)	(b)	(b)	\$2.29	(b)	(b)
2/4	(b)	\$ 9.09	(b)	4.58	(b)	\$5.36
4/6	\$13.42	10.25	\$8.74	6.52	\$13.31	7.42
6/8	12.49	10.09	8.83	6.59	12.42	7.28
8/10	12.42	9.68	8.75	6.40	12.06	7.00
10/12	11.72	9.23	8.67	6.06	11.33	6.86
12/16	11.38	9.02	8.62	5.97	11.31	6.73
16/20	11.00	(b)	8.56	6.01	10.97	6.65
Over 20	10.56	(b)	8.56	6.23	10.46	6.63

Source: INFOFISH Trade News, INFOFISH, Kuala Lumpur, Malaysia, 13/85-1/87

- Notes: (a) All reported prices are wholesaler quotes, New York with the exception of prices reported for India which are CIF, U.S. port of entry.
 (b) No sales in this size category reported.

Table 3. Sources of Lobster Products Directly Imported Into
Hawaii: 1984-86

SOURCE	<u>CALENDAR YEAR</u>		
	1984	1985 (POUNDS)	1986
New Zealand	288,342	329,238	307,922
Taiwan	53,280	30,000	10,350
Kiribati	3,858	6,668	10,927
Australia	2,102	8,545	10,295
China	0	165	16,200
Canada	150	826	6,314
Tonga	1,337	3,267	404
Indonesia	1,007	0	0
Fiji Islands	0	284	0
Total	350,076	378,993	362,412

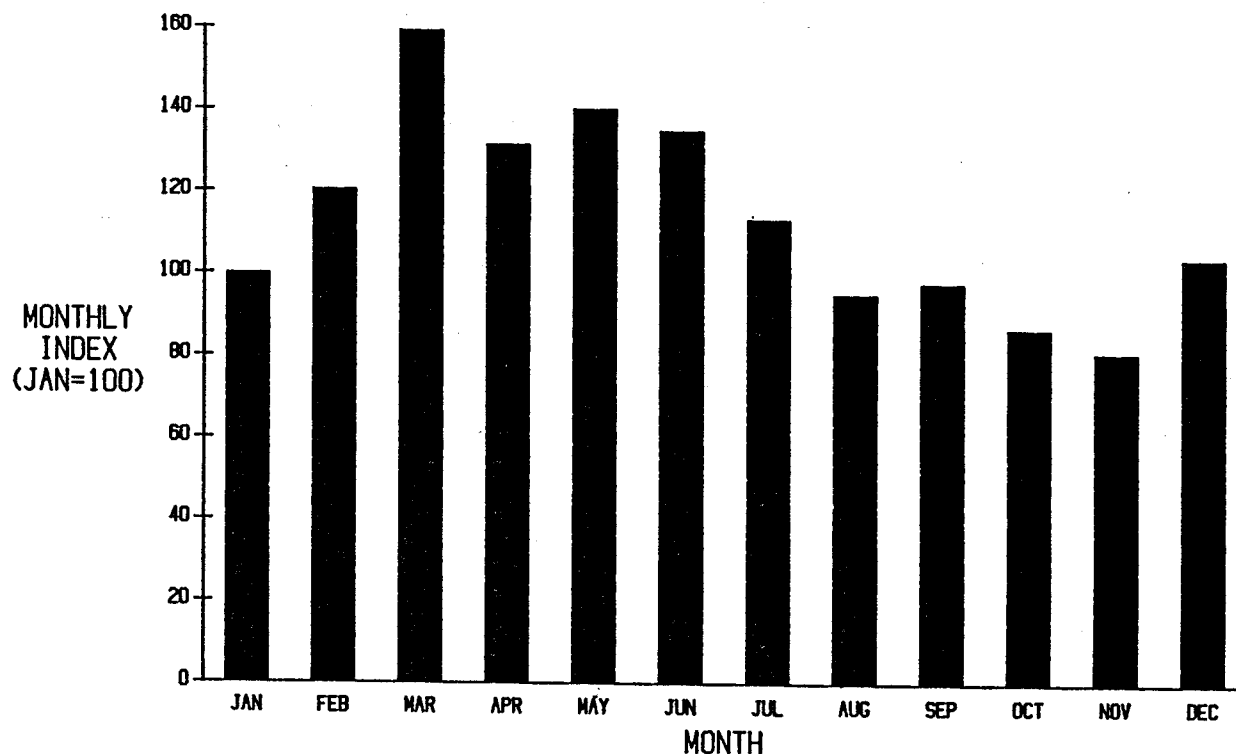
Source: U.S. Department of Commerce, National Marine Fisheries Service, Fishery Market News Report, T1-T147 (Jan. 1984-Dec. 1986), Washington D.C.

Table 4. Forms of Lobster Products Directly Imported Into
Hawaii: 1984-86

FORM	<u>CALENDAR YEAR</u>		
	1984	1985 (POUNDS)	1986
Spiny, Tail	249,858	267,024	246,599
Unclassified	45,003	32,743	40,704
Slipper, Tail	46,280	30,165	39,699
Spiny, Unclassified	1,706	44,834	29,868
Slipper, Meat	7,000	0	4,000
Spiny, Cooked	229	4,077	1,542
Live	0	150	0
Total	350,076	378,993	362,412

Source: U.S. Department of Commerce, National Marine Fisheries Service, Fishery Market News Report, T1-T147 (Jan. 1984-Dec. 1986), Washington D.C.

Figure 8. Monthly Index of U.S. Imports of Spiny Lobsters in
Terms of Edible Product Volume: 1979-85



Source: U.S. Department of Commerce, Bureau of the Census (1986), U.S. General Imports, Schedule A, Commodity by Country: December 1985, Washington D.C. (and previous issues).

lobster products was 126 million pounds, up nearly 25 percent from 1979 (Table 5). This reflects a strong upward trend in per capita consumption that began in 1982. Just over 60 percent of lobster products consumed in 1985 were supplied from foreign sources. This proportion has not changed significantly since 1979.

At least four factors explain the upward trend in U.S. lobster consumption. Post-1983 increases in personal disposable income appears to be one relevant factor. Lobster products are considered luxury goods in the sense that consumption increases with income. Prochaska and Keithly (1984) estimate that a 1 percent increase in real per capita disposable income will induce a 1.4 percent increase in lobster consumption, all other things held equal. Since 1983, real disposable income (total and per capita basis) has increased by 2 to 6 percent annually. A second factor is the decrease in real prices for lobster products at the wholesale level. Wang and Kellogg (1986) estimate that a 1 percent decrease in lobster prices translates into a 3.7 percent increase in quantity of lobster demanded, all other things being equal. As mentioned earlier, real prices for imported and domestic lobster products on the whole declined during 1979-85. The third factor is increasing prices and declining supplies of luxury crab products, in particular king crab, that compete with lobsters for the consumer's dollar. The final factor is an gradual substitution of fish products for red meat by more diet-conscious U.S. consumers.

Lobster is a luxury product, usually consumed in restaurants. The most commonly consumed form is the tail, and various markets have developed for different sized tails. For example, spiny and slipper lobster tails less than 4 ounces dominate sales to medium-priced family restaurants, and to supermarkets as loss-leaders. Medium and high priced restaurants demand tails in the 4 to 12-ounce range, while tails over 12 ounces are often processed.

As a result of the different market niches for lobster tails, prices vary significantly depending on tail size, as well as whether the tails are warm or cold-water spiny species (Table 4). The same pricing phenomenon exists in the market for frozen slipper lobster tails (Table 6). Generally speaking the highest prices are paid for 4 to 8-ounce tails. Smaller or larger tails are discounted, with the level of discount increasing in proportion to the absolute deviation from the preferred size.

MARKETS FOR NORTHWESTERN HAWAIIAN ISLANDS LOBSTERS

Prior to 1978, the NWHI lobster fishery predominantly serviced local restaurant demand for live lobsters. The harvesting fleet shifted from live lobsters to frozen lobster tails as the fishery developed and reached severe constraints in terms of live lobster demand. Since 1983 the amount of lobster produced as frozen tails has continually increased so that in 1985, only 8 percent of landings were marketed alive. The

Table 5. U.S. Consumption of American and Spiny Lobster
Products: 1979-85

YEAR	LANDINGS	IMPORTS	EXPORTS	INVENTORY CHANGE (THOUSAND POUNDS)	APPARENT CONSUMPTION	PER CAPITA CONSUMPTION (POUNDS)
1979	43,485	60,679	(a)	1,507	102,657	0.46
1980	43,813	50,532	(a)	(497)	94,842	0.42
1981	44,113	55,835	(a)	(1,152)	101,100	0.44
1982	45,883	54,420	(a)	(1,065)	101,368	0.44
1983	49,424	63,837	(a)	(225)	113,486	0.48
1984	50,270	73,431	(a)	315	123,386	0.52
1985	51,463	77,429	1,501	1,241	126,150	0.53

Source: U.S. Department of Commerce, National Marine Fisheries Service, Current Fishery Statistics No. 8380 (April 1986), Fisheries of the U.S.: 1985, Washington D.C. (and previous issues).

Note: (a) Not reported prior to 1985.

Table 6. Average U.S. Wholesale Prices for Frozen Slipper Lobsters Tails by Size and Origin: July 1985 - January 1987(a)

TAIL SIZE (OUNCES)	ORIGIN			
	INDIA	INDIA, INDONESIA & PAKISTAN (\$ PER POUND)	SRI LANKA	THAILAND, HONG KONG & TAIWAN
Under 1	\$1.88	\$2.60	\$2.43	(b)
1/2	2.79	3.72	3.16	\$4.75
2/4	3.48	4.74	4.49	5.50
4/6	3.64	(b)	5.44	6.50
6/8	6.45	(b)	7.40	(b)
8/10	6.45	(b)	7.10	(b)
10/12	6.45	(b)	6.90	(b)
12/16	6.15	(b)	6.75	(b)
16/20	5.85	(b)	6.60	(b)
Over 20	5.85	(b)	6.60	(b)

Source: INFOFISH Trade News, INFOFISH, Kuala Lumpur, Malaysia, 13/85-1/87

Notes: (a) All reported prices are wholesaler quotes, New York with the exception of prices reported for India which are CIF, U.S. port of entry.

(b) No sales in this size category reported.

fishery for slipper lobsters is almost entirely directed at the frozen tail market, although demand also exists for live local slipper lobsters. In 1985, an estimated 704,000 pounds of frozen slipper lobster tails were landed (Skillman, Milone and Witham, 1986)

This single product feature of Hawaii lobster tends to reduce the number of distribution channels available to fishermen. The luxury status of lobster further restricts final distribution to a relatively narrow market. Indeed, throughout the U.S., the principal final outlet for lobster products to consumers is through restaurants. Therefore, the principal distribution network for Hawaii lobster tails can be viewed as a vertical hierarchy with product moving from vessels to restaurant patrons on the U.S. mainland (Figure 9).

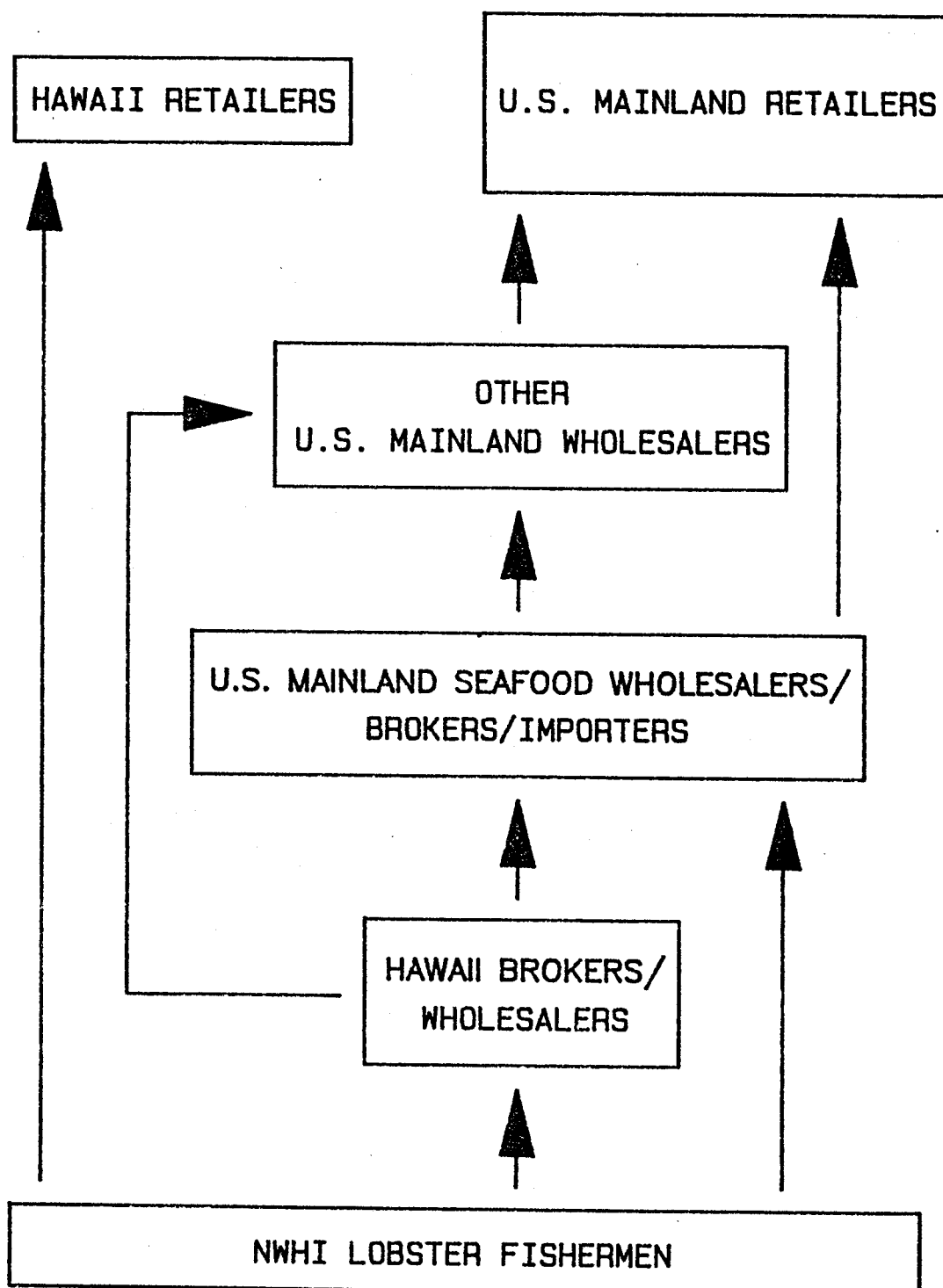
Once Hawaii lobster is purchased by mainland buyers it flows through the same general distribution network as other frozen lobster tail products produced domestically or imported. However, there is considerable variation in the manner in which buyers initially acquire their product. The variations in purchasing directly result from the nature of lobster fishing in Hawaiian waters.

Most lobster fisheries of the world are conducted relatively close to land. Each vessel's catch is held live on-board in tanks and transported to shoreside plants where it is processed and packed. In contrast, Hawaii's lobster fishery is a distant water fishery. Vessels may travel in excess of 2500 miles and remain at sea for more than 80 days on a single fishing trip (Gates and Samples, 1986). Catch is processed, packed, and frozen at sea by the individual vessels. Therefore, shoreside processing and packing plants are not essential to the Hawaii lobster fishery. This feature has a far reaching impact on the distribution and marketing of Hawaii lobster products.

In near shore lobster fisheries, brokers generally procure lobster via purchase agreements made through shore-based packers. Purchase is typically in the form of advanced consignment, that is, a cash advance based on the anticipated price of lobster at the time of delivery. Since catch is processed at sea Hawaii lobster vessels arrive dockside with a finished product. Lobster marketing channels in Hawaii are unique in the respect that each vessel has complete control over the first level distribution of its catch.

Mainland brokers and wholesalers buy Hawaii lobsters in several ways. One of the principal methods is through associations with Hawaii seafood dealers. This is similar to that described for near shore lobster fisheries. Local dealers enter into exclusive purchase agreements with vessels in the fleet. Contracts assure fishermen a designated market price for their catch, and assure that dealers have a sufficient inventory of product to meet the demands of mainland buyers. This type of arrangement affords fishermen several advantages. They can off-load their catch

Figure 9. Market Distribution Channels for NWHI Lobster Products



immediately upon arrival in port and need not bother with cold storage and the associated expense. Local dealers that handle lobster in this manner grade and custom pack products to be shipped to various mainland buyers.

A second distribution channel is direct purchase from individual fishing vessels. This method of purchase stems from the distant-water nature of the Hawaii lobster fishery and the feature of at-sea processing. In direct purchase arrangements, a representative of the vessel is charged with selling the catch by entertaining offers from a number of buyers. Mainland buyers often use Hawaii seafood dealers as local representatives to bid on the product of individual boats. However, in other instances, mainland brokers use their own buyers to bid directly on a vessel's product.

Another principal method for selling Hawaii lobster is based on a interdependent relationship between fishing vessels and a mainland distributor. The distributor bankrolls certain start-up and overhead costs of fishing operations accrued by the vessel, and in return the distributor gains exclusive rights to handle the mainland sales and distribution of the vessel's catch. This method has only been used infrequently.

The manner in which mainland dealers obtain Hawaii lobster seems related to the overall volume of lobster products the dealers handle on an annual basis. The three methods described above are generally employed by large volume dealers (in excess of 100,000 pounds per year), most of which purchase substantial amounts of lobster products from locales other than Hawaii. Small volume mainland wholesalers (less than 100,000 pounds per year) obtain Hawaii lobster primarily from other mainland distributors. Thus, the small volume dealers represent the second tier of the distribution scheme. They acquire Hawaii lobster generally the same way that they acquire any lobster products that they handle. In either case, the patterns for Hawaii lobster products merge with those of lobsters from other areas. However, product differentiation using labeling and promotion is still practiced by some mainland distributors.

Wholesaler Survey

A survey of mainland U.S. wholesalers and brokers was conducted in order to determine and understand the marketing patterns and distribution channels of Hawaii lobster products. These businessmen know where the product comes from and how to obtain it. They are familiar with demand circumstances associated with specific product types and sizes, and they know to which markets the various product types are ultimately distributed.

The survey was comprised of 31 questions which fell into two categories: questions asked to all respondents, and questions that were asked only to dealers familiar with lobster products from Hawaii. The initial survey questions were addressed to all respondents, and they were designed to reveal some of the general

aspects of marketing and distribution associated with spiny and slipper lobster products, regardless of product origin. These questions documented product origin and specifically addressed source of supply (such as who the product was purchased from), size range of product, price and demand structure, and final sales outlet.

Many of the questions asked of wholesalers and brokers familiar with Hawaii lobster products were similar to those asked of all respondents, except they were modified to refer specifically to lobster products from Hawaii. These dealers were also asked a series of follow-up questions which required more detailed answers regarding the marketing patterns and distribution channels of Hawaii lobster products, as well as their opinions on the quality and supply characteristics of lobster products from Hawaii.

The survey concluded with several questions asked to all contacts. Advice and suggestions designed to promote a better understanding of the market for Hawaii lobsters, and potentially improve the marketing of Hawaii lobster products were solicited. Finally, we attempted to document the amount of lobster handled annually by each company, and how lobster products figured into each company's total business volume.

Fifteen metropolitan areas throughout the mainland U.S. were targeted for sampling (Table 7). Areas were selected based on population size and geographic location. An attempt was made to survey as wide a geographic range as possible and still thoroughly survey cities where Hawaii lobster products seemed most likely to be found, based on preliminary information. Thus, out of the 15 metropolitan areas represented in the survey, 5 are located on the west coast of the mainland United States.

The number of completed surveys desired from each site was based on the population of the surrounding metropolitan area. Again, however, more emphasis was placed on cities in which Hawaii lobster products were most likely to be sold, and those cities were surveyed more completely. For example, 4 firms were surveyed in New York but 6 in Los Angeles, the latter being an important entry port for Hawaii lobster products.

The companies selected for interviews within each area were derived from three sources, two of which were independently compiled seafood business directories (Ayers, 1985; Seafood Business Report, 1985). The third method was through referral by other distributors. Often respondents within a particular area suggested other firms in the same area that were known to handle substantial amounts of lobster products. Referrals proved to be a valuable way of making contacts, particularly on the west coast.

Sample selection was not done in a random fashion. As such, the survey results are not open to rigid statistical interpretation. However, the primary purposes established at the outset of the

Table 7. Geographic Dispersion of Wholesaler Respondents

METROPOLITAN AREA	NUMBER OF COMPLETED SURVEYS	DO NOT HANDLE HAWAII LOBSTERS	DO/HAVE HANDLED HAWAII LOBSTERS
New York/New Jersey	4	4	0
Boston	2	1	1
Philadelphia	2	2	0
Detroit	2	2	0
Chicago	4	3	1
Tampa	1	1	0
Houston	1	1	0
Dallas	1	1	0
Denver	2	1	1
Phoenix	3	1	2
Seattle	4	0	4
Portland	3	1	2
San Francisco	4	1	3
Los Angeles	6	3	3
San Diego	3	2	1
Total	42	24	18

survey were accomplished, and the results suggest that a majority of firms handling substantial amounts of Hawaii lobster products were contacted.

Telephone surveys were conducted from Honolulu between August 11, and August 22, 1986. Forty-two firms that handled spiny and/or slipper lobster were interviewed. Eighteen of the firms surveyed presently handle or have handled Hawaii lobster products.

Attitudes About Hawaii Lobster Quality

Respondents' attitudes about the quality of Hawaii lobster were equally divided among three wide ranging impressions. One group felt that the quality of lobster products from Hawaii was on par with lobster from Australia, which represents the industry standard. Other buyers held neutral opinion. They had no complaints about quality, although they did not consider it outstanding. The third group of buyers complained that the quality of Hawaii lobster was widely variable and inconsistent.

Two specific quality problems were identified by all of the dealers that mentioned they had quality concerns. In their opinion, Hawaii-produced lobster tails were poorly veined and/or off-color. Both of these problems result from poor on-board quality control and could easily be eliminated. The deveining of tails is a mechanical procedure performed by one of the deck crew during processing. Only a little additional time would be required to do the job thoroughly. Tails are placed in seawater to soak after deveining. If the soak water is fouled or dirty, or if tails are not soaked long enough, they turn off-color, or grayish. The problem can be remedied by increasing the water flow to the soak tank, adjusting the circulation, or changing the soak time.

It may seem curious that problems which seem to have simple solutions are allowed to persist, and that product quality reportedly varies so much in the first place. The explanation lies in the nature of the fishery. Each vessel subscribes to its own set standards of quality since all processing is done at sea on an individual basis. Consequently, there are as many quality standards as there are boats fishing due to the absence of industry standards. The wide variation among the quality standards in delivered products works against creating a consistent consumer image of product quality.

Attitudes About Hawaii Lobster Supply

Two thirds of the respondents who handle Hawaii lobster have encountered problems with product supply. Generally, complaints have echoed the feeling that Hawaii lobster is not available on a timely basis in the quantities and sizes desired. Product supply problems stem partly from the scale and characteristics of the fishery and partly from the distribution channels that have evolved.

The fact that NWHI lobsters are sold nationwide is evidenced by the geographic dispersion of respondents handling the product. This is true even though Hawaii supplied less than one percent of U.S. spiny lobster consumption in 1985. This "shotgun" approach to market distribution leads to uneven and inconsistent product availability throughout the year in most areas. Spot shortages that have become more noticeable during the past several years are a direct result of the widening of product distribution.

Fleet fishing patterns may have also added to inconsistencies in product supply, although the effects are uncertain due to lack of data on cold-storage inventory practices. First of all, the active fleet is relatively small. Sixteen boats fished during 1986. Secondly, the length of fishing trips has continually increased. In 1985 trips lasted an average of nearly 40 days at sea, and some were as long as 80 days. The production increases over the past four years have not offset the combination of longer time intervals between deliveries and wider distribution of product. Third, there is a marked seasonality in historical NWHI lobster landings. For 1983-85, a relatively large number of vessels landed their catch during the peak months of April, August and December compared with January, May and November.

The characteristics of the fishery also contribute to product supply problems in another fashion. Buyers report that the size distribution of the catch fluctuates widely between loads. The percentage of tails in the most demanded size range (generally 6-8 ounce tails) is too small, and large tails (greater than 8 or 10 ounces) is too high. This is a direct supply problem which exists because of the characteristics of the harvested population. In cold-water fisheries, problems like this are to a large extent ameliorated through centralized processing. The size distribution of the final product is more consistent because packing houses receive catch from lots of boats. Consequently, buyers are generally assured of receiving shipments containing the same distribution of sizes time after time.

Vessel-direct purchase schemes magnify the effects of variations in product size distribution and indirectly create supply shortages. Distributors are reluctant to purchase loads of too many large sized tails and not enough of the most demanded sizes. Large tails are unpopular because they are too costly to serve as restaurant entrees. Therefore, distributors are forced to sell the large tails at discount prices. Normally profits from the sale of the popular sizes are designed to offset the marginal profitability of large tails. So, buyers pass on loads that contain too many larger lobsters and not enough smalls which indirectly produces a supply shortage. The supply shortage is indirect because product is available, but not in the most profitable combination of sizes.

Direct purchase contributes in another manner to produce inconsistencies in product supply. When fishermen bypassed local dealers and middlemen to market their own product their aim was to secure a larger share of the total product revenues for

themselves. As brokers they set their own asking price, which buyers often feel is too high. In these situations buyers stall. They may wait until another boat arrives and offers product at a lower price, or until the original asking price for the first load is reduced. Supply shortages of this type are also indirect because product is available, but the price is too high for immediate purchase.

Attitudes About Spiny Lobster Sizes

The size of spiny lobster tail which is most popular, or most demanded, by mainland brokers is dictated by the restaurant trade. Although there is some degree of variation, the most popular sizes are ones sufficiently large to be served as entrees, or small enough to be served in meat seafood combination plates. The most popular size range mentioned by survey respondents was 5 to 8 ounces (Table 8). Some distributors expanded the range to include tails between 4 and 10 ounces. However, even though these are the easiest sizes to sell, large distributors purchase the entire spectrum of available sizes, which range from less than 1 to 24 ounces.

The preference for medium-sized lobsters stems from the fact that larger lobster tails are generally too costly to serve as entrees in restaurants. Consequently they are less popular with restaurant buyers and wholesalers alike. However, if producers allowed buyers to purchase only the most desirable sizes, their inventories of large-sized tails would continually increase. In order to move the large sizes, producers leverage their sales. In return for supplying the amount of medium sizes desired, producers request buyers to purchase certain amounts of larger-sized, less desirable tails. If the purchases are made from a product distribution center, such as exists in Australia, then the ratio of smaller, more demanded tails, to the less desirable sizes remains fairly consistent over time. This is because so many boats deliver product to a single centralized plant for processing and packing. With so many contributors the between-boat size variation of the catch is smoothed out. Brokers report that they can generally get about 60 percent of the purchase volume within the most desirable size range.

The situation is markedly different in vessel-direct purchase situations such as the NWHI lobster fishery. Since vessels peddle their own catch, and act independently, there is no way to smooth out the normal oscillations in the size distribution of the catch. This is one of the difficulties associated with individual vessels marketing their own catch. One load might contain a very low percentage of tails outside the most demanded size range. In the next load, the situation may be reversed.

Direct purchase buyers are reluctant to buy loads that contain larger tails because of the difficulty in selling tails greater than 8 ounces at regular prices. Several distributors reported that even with price discounts creative marketing is required in order to keep inventories of large tails low.

Table 8. Wholesaler Size Preference for Frozen Lobster Tails

TAIL SIZE (OUNCES)	<u>SPINY</u>			<u>SLIPPER</u>		
	DID HANDLE HAWAII SPINYS	DID NOT HANDLE HAWAII SPINYS	TOTAL	DID HANDLE HAWAII SLIPPERS	DID NOT HANDLE HAWAII SLIPPERS	TOTAL
	(NUMBER OF RESPONDENTS)					
1/2	0	0	0	5	7	12
2/4	0	0	0	8	10	18
4/6	10	18	28	9	3	12
6/8	16	19	35	6	0	6
8/10	8	12	20	3	0	3
Over 10	2	7	9	0	0	0

Survey responses suggest that if buyers are not able to obtain consistent amounts of the most desirable sizes on a timely basis, they are reluctant to market the product aggressively. Selling customers on a particular lobster product can be difficult, especially if supply is unpredictable in terms of assortment or total quantity.

Attitudes About Slipper Lobster Sizes

The most preferred sizes of slipper lobster tails are smaller than for spiny tails (Table 8). Many respondents reported a size preference for slipper tails in the 1 to 4-ounce range. Tails of this size are bought in IQF form without the shell. This product form of slipper lobster that is smaller than 4 ounces has a distinctly different market than spiny lobster tails. It is still used primarily in restaurants (Chinese and Italian were mentioned most frequently), but in dishes where entree sized lobster is not required. Most of the buyers who were unfamiliar with Hawaii lobster products were also unfamiliar with larger sized slipper lobster tails (greater than 4 ounces).

Respondents who handled Hawaii slipper lobsters tended to prefer the larger slipper tails (4 to 6-ounce) in the shell. The market for larger tails seems to be more flexible than that for either spiny tails or IQF slipper meat. Slipper lobster tails are popular in franchise family restaurants, but also easily substitute for spiny tails in medium to high-priced restaurants that serve "surf and turf" combinations or broiled lobster tails. Slipper lobster tails also are widely retailed in supermarkets. Their lower price makes them an affordable commodity for home consumption, and they are often used for loss-leader promotion. Slipper lobster tails compete directly with spiny lobster as restaurant entrees. One respondent reported that in taste tests that he conducted where Hawaiian slipper lobster was tested against spiny lobster from a variety of locations, 90 percent of taste-test subjects preferred the slipper lobster. This marketing flexibility, combined with the fact that slipper lobster is priced 30 to 50 percent lower than spiny lobster, makes the larger slipper lobsters attractive to many buyers.

Marketing advantages associated with medium-sized NWHI slipper lobsters do not exist with the smaller lobsters less than 4 ounces. Although a strong market exists for smaller tails, the majority originates in southeast Asia or India. Labor costs are extremely low in those regions, which are reflected in the low price of tails of this size (Table 6). Hawaii-produced lobsters cannot compete effectively in this market. Although the quality of the Hawaii product is reportedly much higher than that of slipper lobster produced in Asia, most buyers, and their customers, do not perceive that the quality difference commands the necessary price premium. Consequently, as long as production in those countries remains high enough to meet demand, it is unlikely that this situation will change.

Respondents' Ideas About Improving NWHI Lobster Marketing

Respondents were queried in an open-ended format about how Hawaii fishermen could improve their general marketing efforts for NWHI lobsters. Suggestions were made for improvement in four main areas: increased promotion, increased volumes, increased supply consistency and higher quality control.

Four of the 15 respondents suggested that Hawaii lobster producers could benefit from a promotional effort to differentiate their product from inferior warm-water products. It was mentioned that product differentiation could occur either through media advertising, informational brochures, or product branding. Several respondents predicted that Hawaii lobsters could compete very well in the market against higher-priced cold-water lobsters, provided the product image of the NWHI was enhanced.

Five respondents mentioned that increased volumes of desired sized would significantly enhance the marketability of NWHI lobsters. In the event that this could not be accomplished through increased production, the option of concentrating sales distribution to a limited geographic area was mentioned. In this way volumes could be increased for a reduced number of selected buyers. This strategy could also lead to increased volume consistency, which 4 respondents indicated needed improvement.

Finally, increased attention to quality control in terms of product grading and packing was mentioned by 4 out of 15 respondents. Again reference was made to the fact that with good quality control, Hawaii lobsters could compete more directly with higher-priced, cold-water lobsters coming from countries with strict quality control practices.

CONCLUSIONS AND RECOMMENDATIONS

All indications suggest a positive market outlook for NWHI lobsters. Demand for NWHI lobster products will continue to grow over the next two to three years following the general growth in U.S. consumer demand for lobster products. This increased demand, generated by increases in personal income, will tend to generate modest increases in the real price of spiny and slipper lobster tails, somewhere in the range of 3 to 7 percent, annually.

Increased U.S. demand will be met primarily by increased imports of slipper lobster products (IQF meat and larger tails with shells) from warm-water areas of the world. Barring any unforeseen demise of spiny fisheries in Australia, New Zealand or South Africa, spiny imports will remain fairly constant. However, the weakening trend in the value of the U.S. dollar will to some extent work against imports, thereby putting upward pressures on market prices.

The U.S. market for lobster products in all size ranges will continue to be firm over the next few years. NWHI fishermen will have strong revenue incentives to increase their fishing effort. Demand for all lobsters caught with 4 to 8-ounce tail weights will tend to be strong. However, NWHI fishermen may find it increasingly difficult to compete with foreign sources for tails less than 4-ounces in the face of increased imports of frozen IQF slipper tails. Fishermen will begin to detect reduced average selling price of loads that contain large amounts of small slipper lobsters.

Given firm market conditions, NWHI lobster fishermen will have little difficulty marketing their catch, even with current low-level promotional efforts, and lack of marketing order. Nevertheless, there appear to be sufficient reasons to investigate opportunities for improving product promotion, and initiating basic marketing order. However, both areas are very complex and will involve considerable inter-industry coordination and cooperation, along with government support.

Product Promotion

Based on suggestions obtained in the survey, it appears that enhanced promotion is needed to differentiate NWHI lobster products from those produced in other warm-water regions, and to inform buyers about the attractive quality attributes of both spiny and slipper tails. The feasibility of a systematic industry-wide approach to this marketing effort should be further evaluated.

Market Order

It appears that an increased promotional effort may be ineffective unless quality standards are adhered to and size offerings become more consistent. Suggestions for instituting more orderly marketing, following the pattern of cold-water lobster-producing nations, were routinely mentioned by respondents.

There are numerous ways that NWHI lobster marketing could be more orderly. One avenue is for several boats to enter into a cooperative agreement whereby each contributes to a common cold-storage pool that is jointly managed. This is the Australia approach. A larger inventory would allow oscillations in the size distribution of the catch to be damped out. A more consistent ratio of desired to less desirable sizes will be established that buyers can count on. Yet another way to overcome supply problems, and still retain the greatest amount of independence for individual vessels, is for several boats to agree to concentrate marketing efforts within the same area, perhaps through the same dealers. This would also allow a more steady supply of product to enter a concentrated market rather than being spread out to widely scattered markets from coast to coast. These options, as well as others, should be systematically evaluated by industry participants.

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